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METHODOLOGY OF COMPUTING GROSS INDUSTRIAL PRODUCTION GROWTH RATES

Voprosy ekonomiki [Economic Problems], No 8, August 1955, Moscow, Pages 63-76

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High industrial production growth rates are characteristic of the socialist economy. These rates greatly exceed development rates of the leading capitalist countries. In 1955 the volume of industrial production in USSR will exceed that of 1950 by 80%, while the 1940 volume will be tripled. The industrial production volume set for the end of the Fifth Five-Year Plan was fulfilled 8 months ahead of schedule.

Correct computation of industrial production growth rates is most important for a proper management and economical administration of socialist industry.

An important factor in economic analysis of long range statistical materials is played by theoretical generalization and further development of methodology, as applied to the computation of indexes of the physical volume of industrial production.

The indisputable superiority of socialist production makes it possible to compute USSR industrial production growth rates by estimating gross production elements in comparable wholesale prices. The correct determination of the physical volume of industrial production is based on an exact definition of the composition of gross production, as well as on the choice of comparable wholesale prices applied to the elements of gross production.

The gross production index, being an index of volume production, within any individual enterprise must characterize the final result of the work of the enterprise for a given period. Thus, gross production does not include production cost of goods used by the given enterprise for its own needs. Exceptions to this rule are sometimes made in the separate industrial branches (for instance, the addition, to the cost of refined sugar, of the cost of refining sugar in powdered form), and are explained by the fact that in such industrial branches several manufacturing processes have been combined.

The most important element entering into the composition of gross production is the cost of finished products. Additional elements of gross production are: cost of industrial production done on outside orders and cost of modification of remainders of intermediate products; in the branches having an extended production cycle (machine building plants, enterprises engaged in steel construction, and repair plants) the cost of modifying the remainders of unfinished production constitutes an additional element of gross production. In industrial branches with a short production cycle these modification costs do not influence the scale of gross production and are computed with the gross production cost.

It is important that a distinction be made between the various elements of gross production: unfinished products, intermediate products, and finished goods. This has not only theoretical but also practical significance, particularly because the cost of modification of remainders of intermediate products is considered an element of gross production in all the industrial branches, while the cost of modification of

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reminders of unfinished products has significance only in branches having an extended production cycle. These questions must be resolved because certain products, in some cases, may be considered as finished goods, while in other cases they may be classified as intermediate products.

Some of these issues can be resolved in several ways, depending on the viewpoint respectively of a separate enterprise, a trust, main administration, or a department. For instance, from the viewpoint of a separate enterprise the finished goods are those manufactured by the enterprise for outside delivery if these goods are finished, conform to prevailing standards, and are passed through the technical inspection. On the other hand intermediate products manufactured by an enterprise are goods that have undergone a technological manufacturing process in one division of an enterprise, but are subject to further processing in another division of the same enterprise. Unfinished products differs from intermediate products by the fact that they are goods that await completion in one individual divisions of the enterprise.

Gross industrial production is planned and rated by the factory method. Gross production computed by the Central Administration, or given by a district, represents the sum of gross production of separate enterprises that make up a main administration, or that are located in a given district. The total of gross industrial production for the USSR represents the gross production of all departments or of all allied republics. With this, repeated computing can take place only for the part manufactured and used in the industry; while another part of the industrial gross production for the community, i.e., appears as the index of the net production or the national income from industry.

The indexes of physical volume of industrial production are computed on the basis of the estimate of gross industrial production compared with the enterprise wholesale prices. The following question may be asked: of the two basic types of prices used in industry, i.e., industrial wholesale prices and wholesale prices of an individual enterprise; why is preference given to the latter prices?

The following two factors are considered advantageous: firstly wholesale prices of an enterprise are those real prices at which industrial enterprises sell their production, either to the consumers or to the corresponding sales organizations.

These prices are the basis for all the financial and economical activity of industrial enterprises. These wholesale prices are used not only for the planning and the rating of the absolute industrial production volume on the enterprises, but also for the determination of its dynamics. Secondly, if industrial wholesale prices, i.e., prices which include the tax on turnover are used the disproportionately great influence on the general index of physical industrial production volume would result in changes in the tempo of growth of industrial branches particularly of those producing consumer goods.

It is well known that the net income of a society is created in all the branches of production. Yet the turnover tax flows to the state through the mechanism of prices, particularly those in the branches manufacturing consumer goods. The production prices of industrial branches, which manufacture the means of production, as a rule do not include the turnover tax. Therefore wholesale industrial prices of the means of production are equal to the wholesale prices of individual enterprises, while between the wholesale industrial prices and the wholesale prices of the consumer goods enterprises there is, as a

rule, a definite difference resulting from the turnover tax. Therefore the use of industrial wholesale prices in computing the indexes of physical volume of production is wrong methodologically, since the industrial branches producing consumer goods would have a specific share in the index constructed on the basis of these prices, not corresponding to their virtual national economic significance. Let us illustrate this by presenting a sample computation of industrial production growth rates on the basis of the estimate of gross production of individual wholesale prices and of industrial wholesale prices:

	Basic period	Accountable period	Accountable period in % of basic period
<u>Example 1</u>			
Gross production of individual wholesale prices (1000 rubles)	100	124	124
Including:			
production of means of production	30	91	130
production of consumer goods	70	33	110

Example 2

Gross production in industrial wholesale prices (1000 rubles)	130	157	121
Including:			
production of means of production	30	91	130
production of consumer goods	100	66	110

As we see, in both examples the manufacturing of means of production increased by 30%, and manufacturing of consumer goods by 10%. Yet the volume of total production increased in the first example by 24%, and in the second by 21%. This occurred as the result of the estimation of consumer goods in the second example, the production of which increases at a smaller rate than the production of means of production, expressed in industrial wholesale prices, i.e., including the turnover tax; thus the computed index of total production volume growth tends to be lower.

To compute the growth rates of the growing socialist production governed by the primary condition of the rapid development of the production of means of manufacturing at a rate higher than that for the manufacture of consumer goods, individual wholesale prices must be used because an estimate expressed in industrial wholesale price depresses the gross industrial production growth rates. Quite different is the matter of determination of the absolute scale of industrial production. In this case the estimate of industrial gross production must be, and is, based on industrial wholesale prices, i.e., price which include the turnover tax.

To compute the rates of industrial production growth, it is necessary to compare gross production figures for the period under consideration in similar terms, that is, comparable wholesale prices. Data of gross industrial production given in wholesale prices that were in effect in each of the periods under consideration cannot characterize changes in the physical volume of production, since applicable wholesale prices change in accordance with reductions which are being systematically effected in the USSR as a result of the growth of labor productivity

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and the reduction in the costs of industrial production. For this reason, indexes of the physical volume of industrial production must be determined on the basis of exact data obtained through direct evaluation in enterprises producing elements of gross production; this evaluation must be made on the basis of comparable wholesale prices.

It is known that indexes of the physical volume of industrial production can also be computed with the help of a second method, that is, on the basis of production indexes expressed in effective wholesale prices, using price indexes. However, for a number of reasons this method, which theoretically is unobjectionable and which has found application in individual economic computations, cannot in actual practice be applied successfully with respect to our planning and statistical endeavors.

In the process of checking on the fulfillment of government plans for the national economy and in the determination of additional resources and reserves that would overfulfill the plans, and also in the course of work on the preparation of plans, particularly of overall plans for the development of the national economy of the USSR as a whole, and of its individual branches and economic regions, there appears the need for the determination of the development rates of industry on the basis of many interdependent economic, territorial, and jurisdictional direction. Quite obvious is the need for computation of indexes of the physical volume of industrial production not only on the basis of the USSR industry as a whole, but also on the basis of individual branches of industry; for the primary reason that the proper determination of the growth rates of heavy industry and its primary industries, machine building constitutes the most important basis for continued technological progress in the national economy. It is also necessary to compute growth rates of industrial production by individual ministries, main administrations and trusts, as well as, by the individual union republics, krais, oblasts, and economic rayons.

If under these conditions growth rates of production are determined on the basis of gross production indexes, expressed in actual prices, and with the help of wholesale price indexes, price indexes would have to be computed for each of the regions separately. For example the wholesale price index computed on an overall basis for a given ministry, may turn out to be inapplicable for individual main administrations of that ministry, because differing shares in production may produce different wholesale prices for the ministry and its main administrations. In such cases it becomes necessary to compute individual indexes for these administrations. The same is true when indexes of wholesale prices are computed for main administrations and trusts, union republics, oblasts, etc. For these reasons it would become necessary to compute wholesale price indexes from existing comparable prices separately for the whole USSR industrial production, for various branches of industry, ministries, main administrations, trusts, union republics, krais, oblasts, and economic rayons. With regard to the need for the determination of industrial production growth rates for different periods, it would become necessary to compute most wholesale price indexes on the basis of a specific year which would serve as a basis for comparison in every individual case. Separate price indexes for all areas mentioned above would have to be computed to facilitate determination of the extent of price changes over a given period; compared with the corresponding period in the previous year, compared with any earlier period in the same given year, compared with the base year of the Five-Year Plan, compared with a similar period of a prewar year, etc. All these complex computations which are not easy to control would have to be carried out not only in the central planning and statistical agencies, but also in the ministries, main administrations, trusts, union

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republics, and oblasts. This procedure would certainly result in conflicting indexes of physical volume of industrial production computed on the one hand from data prepared by the ministries, and on the other, from data submitted by the oblasts. It must also be remembered that workers in the enterprises will have to know in what way the physical volume of their production changes. However, the preparation of complex economic computations of price indexes by the enterprises themselves would result in unnecessary burdening of lower echelon planning and statistical activity.

Therefore the most practical way of obtaining indexes of the physical volume of industrial production is the method of direct evaluation of gross production with the help of comparable wholesale prices, carried out directly at the enterprises.

Much of experience has been accumulated in the USSR planning and statistical activities in the application of comparable wholesale prices for the determination of industrial production growth rates.

From the early days of the Soviet government through 1927 the rate of industrial production growth has been determined through evaluation of production at the 1911-1912 prices. Beginning with 1927 and through 1949, based on evaluation determined in the preparation of the first Five-Year Plan, gross production of government industry was planned and computed at the 1926-1927 prices. Gross production of the cooperative industry for the years 1932 through 1949 was planned and computed at the 1932 prices. Overall totals for industry were determined in the organs of the TsSU [Tsentrall'nogo statisticheskoye upravleniye -- Central Statistical Administration] USSR by way of recomputation of the production of the cooperative industry from 1932 prices into the 1926-1927 prices on the basis of price indexes.

The 20-year period of application of the 1926-1947 prices for purposes of planning and accounting for industrial production proved that the prolonged use of comparable prices in computing the dynamics of the physical production volume is not satisfactory because in the course of so long a period the structure of a branch of industry changes substantially, that is, new industries and types of production spring up within the branch. Thus the need for a review of the comparable prices became obvious.

Beginning in 1949 the method of planning of gross industrial production with the aid of the unchanged 1926-1927 prices was superseded by a method utilizing actual wholesale prices. In the accounting, however, along with gross production indexes based on actual wholesale prices, there were retained, for 1949 and 1950, the gross production indexes expressed in the unchanged 1926-1927 prices; this was done to maintain comparability between statistical indexes and indexes of the fourth (the first postwar) Five-Year Plan for the years 1946 through 1950, confirmed with relation to gross production expressed in the unchanged 1926-1927 prices. Thus, in 1949 and 1950 industrial growth rates were determined on the basis of the evaluation of production in 1926-1927 prices.

The transition in the planning and accounting of gross industrial production from the 1926-1927 price basis to one utilizing actual wholesale prices, served to stimulate the reform of wholesale prices carried out and promulgated on 1 January 1949 and also brought about the liquidation of the system of providing government subsidies to individual branches of heavy industry and the transportation industry. The elimination

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of the system of government subsidies resulting from the gap between the increase of production costs of individual branches of heavy industry during the war years and the stabilized level of wholesale prices that had been determined in the prewar period and remained unchanged throughout the war years, was accomplished with the aid of a considerable reduction in the costs of industrial production and the determination of wholesale prices for heavy industry production at a level slightly above that of prewar wholesale prices. In the subsequent years, based on systematic reductions in the costs of production, the USSR government on several occasions reduced the level of wholesale prices for heavy industry production and also reduced rates for freight transportation. As a result of these actions, wholesale prices and rates in heavy industry and in the transportation industry in 1951 were reduced to 1948 levels, even though the system of government subsidies was eliminated with respect to all branches of industry (with the exception of logging) and transportation. The promulgation on 1 January 1949 of reforms in the wholesale prices of heavy industry production was accompanied by a reorganization of the wholesale price systems in light industry and in the food industry. Special wholesale prices were introduced to various enterprises and steps were taken to eliminate many procedures existing prior to 1949 in various branches of industry for making profit.

Thus a system of wholesale prices applicable to industry was established, and further wholesale prices were determined for the enterprises (the so-called factory plan prices), that is, wholesale prices excluding the tax on turnover; the wholesale industry prices, that is, wholesale prices that included the tax on turnover.

It must be remembered that the wholesale prices of an enterprise exclude the tax on turnover only with respect to final production. Wholesale prices of enterprises in a number of industry branches, particularly in light industry and the food industry, actually include the tax on turnover because of its inclusion in the price of raw materials that are used by the enterprises in these branches. Production in the baking industry normally is not subject to the tax on turnover. However, flour and sugar, used by these enterprises, are paid for by the baking industry at prices that include the tax on turnover. Thus wholesale prices of baking industry enterprises actually contain the tax on turnover. This factor must be remembered in the study of the structure of a branch of industry and in the determination of the relative weight of the branches engaged in producing the means of production (group "A") and branches engaged in the production of consumer goods (group "B"), upon any computation of the production costs of the latter. The tax on turnover, which is included in the wholesale price of an enterprise through taxed raw materials prices, must be excluded in such cases.

During the preparation of the Ninth Five-Year Plan for the development of the USSR national economy in the years 1951-1955, the wholesale prices of the enterprises as of 1 January 1952 were used as the basic comparable wholesale prices for the entire 5 year period. These same prices are also used in the evaluation of plan fulfillments and in the determination of gross production growth rates for various years of the Five-Year Plan. In order to form a comparable basis for industrial production growth rates for the period up to and including 1950 (in which gross industrial production was still evaluated at the 1926-1927 prices) with production growth rates during the 1951-1955 years, the enterprises recomputed data on gross production in 1950 with regard to their wholesale prices that became effective on 1 January 1952.

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Experience in the application, planning, and computation of industrial production on the basis of enterprise prices effective from 1 January 1952, has shown that the utilization of comparable wholesale prices for a period longer than 5 years is not useful. At the present time wholesale prices of the enterprises that were promulgated on 1 January 1952 do not truly reflect the actual value in relationship and in production conditions of different types of production. In addition, during the years from 1952 through 1955 the Soviet industry has begun to make new types of products for which no wholesale prices were established on 1 January 1952; this causes difficulties in planning and computation of such products. Under such conditions, the retention of wholesale enterprise prices promulgated on 1 January 1952, in planning and computation of gross industrial production during the Sixth Five-Year Plan could produce adversity in cost computation procedures, and a reduction in the stimulus required by enterprises for the production of certain important types of goods.

An important condition for the use, in the Sixth Five-Year Plan, of the new comparable wholesale prices, is the reduction of wholesale prices for heavy industry products, promulgated on 1 July 1955 on the basis of a reduction in industrial production costs achieved in the period from 1952 to 1955. On 1 July 1955 reductions were announced in the wholesale prices of fuel, ferrous and nonferrous metals, machinery and equipment, chemicals, products of the cellulose and paper industries, constructional materials, as well as rates for electric power heating, rail (including freight) transportation. As a result of these new reductions, wholesale prices of productions produced by heavy industry were established at a level considerably below that which they held prior to the abandonment of the system of subsidization by the government.

The reductions of 1 July 1955 produced a better adjustment of wholesale price standards, as well as an improvement of value relationships among similar types of goods and also among raw materials, semi-finished goods, and finished goods. Thus the interest of enterprises in efficient management and in the successful fulfillment of industrial production plans, economical use of raw materials and other materials, fuel and energy, and the reduction in distances over which goods are transported.

In accordance with government decrees issued during the years 1956 through 1960, the planning and computation of gross production in the USSR as a whole, as well as by individual ministries and enterprises, will be based on the 1 July 1955 wholesale price index. Beginning in 1956 planning of labor productivity standards (production per worker) will be carried out on the basis of gross production volume computed at wholesale enterprise prices of 1 July 1955. To compare volume of industrial production with production expenditures and financial indexes, the planning and computation of commercial production will continue to be based on actual wholesale prices of the enterprises. In addition the gross production index, expressed in wholesale prices, is retained for purposes of preparing annual accounts.

In connection with the transition to the new comparable enterprise wholesale prices, it became necessary to produce data for 1955 gross industrial production expressed in wholesale enterprise prices of 1 July 1955, along with the evaluation of such production expressed in wholesale enterprise prices of 1 January 1952, so that data for 1955 could be compared with data of subsequent years. For the first half of 1955, in which gross production was evaluated in terms of wholesale prices that were effective on 1 January 1952, the recomputation of production

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into 1 July 1955 prices is carried out by the enterprises along with a further breakdown of the period into quarters. To simplify recomputation, permission has been given to establish a direct valuation in wholesale prices of 1 July 1955 not for all elements of gross production but for the major portion, that is, for finished goods, through the application of the wholesale price index for 1 July 1955 with respect to 1 January 1952 prices, and to apply these prices to a portion of overall gross production which in the past had been evaluated in wholesale enterprise prices of 1 January 1952. For the second half of 1955, the corresponding gross production indexes based on 1 July 1955 prices, are included in the accounting forms of the enterprises, along with the retention (until 1 January 1956) of gross production indexes expressed on 1 January 1952 prices.

The transition to planning and computation for industrial production in terms of the new comparable enterprise prices (the 1 July 1955 prices) almost completely excludes the possibility for direct comparison of the absolute magnitude of gross production with similar data for previous years, computed on the basis of different prices. In that regard there arises the question of methods for the determination of industrial production growth rates on the basis of which it will be possible, during 1955-1960, to compute indexes of physical volume of production with respect to any year of the 1951-1955 period or for years prior to 1950.

The solution of this problem through the recomputation of gross production figures for the years before 5-year plans into enterprise wholesale prices that were promulgated on 1 July 1955 is not an efficient one. The distribution of value relationships among individual types of production, that have been developed in contemporary industry and that reflect the current level of technological development and organization of production, to production of the Soviet industry in the past 5 to 15 years, is economically not feasible. Also this would mean that after every transition to new comparable wholesale prices one would again have to reevaluate, in terms of the latest prices, the data for gross production of the last 5-year plans.

For this reason, in spite of certain shortcomings inherent in the chain method, particularly in cases where changes have taken place in the structure of an industry branch, the solution to this problem must come through this very method. The index of the physical volume of industrial production must be computed on the basis of the aggregate index formula, that is, formula $\frac{\sum q_1 p_0}{\sum q_0 p_0}$ in which q_1 and q_0 quantities of production for the accounting and the base periods respectively, and p_0 is the comparable wholesale price.

A sample computation of industrial production growth rates in 1956 is compared below with the rates of the prewar year 1940, with allowance for the fact that gross production in 1940 was evaluated on the basis of the 1926-1927 prices, while that of 1956 is expressed in prices effective on 1 July 1955.

GROSS PRODUCTION (1,000 rubles)

At 1926-1927 prices

1940	50,000
1950	90,000
1950 (as a percentage of 1940)	180

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At prices effective on 1 January 1952

1950	180,000
1955	296,000
1955 (as a percentage of 1950)	164

At prices in effect on 1 July 1955

1955	280,000
1956	305,000
1956 (as a percentage of 1955)	109

The computation of gross production rate growth for 1956, compared with 1940, through use of the chain method in the given example is made on the basis of multiplication of the three link indexes:

$$\frac{q(1956) \times p(1 \text{ July } 1955)}{q(1955) \times p(1 \text{ July } 1955)} \times \frac{q(1955) \times p(1 \text{ January } 1952)}{q(1950) \times p(1 \text{ January } 1952)}$$

$$\frac{q(1950) \times p(1926-1927)}{q(1940) \times p(1926-1927)} = \frac{109 \times 164 \times 188}{100} = 336 \%$$

To permit use of the chain method, figures for gross production in 1950 were recomputed into 1 January 1952 prices, while data on 1955 gross production are currently being computed on the basis of 1 July 1955 prices. As for determination of indexes for physical volume of production in the 1956-1960 period with respect to any year of the Fifth Five-Year Plan, there is no longer any need for the third chain index.

In this manner, the method used in the planning and accounting for industrial production consists of the following: industrial production growth rates are determined on the basis of the evaluation of gross production expressed in comparable wholesale enterprise prices. In the preparation of annual plans, and in their execution, the same comparable enterprise wholesale prices are used as those used in the preparation of the overall five-year plan for industry. Thus it is possible to compare industrial production tasks specified in any one year and their fulfillment with the overall program established by the five-year plan. Similarly the valuation of gross industrial production for the five-year period expressed in comparable enterprise wholesale prices makes it possible to determine the growth of physical volume of industrial production and the progress made by industry in fulfillment of the current Five-Year Plan.

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